INTERFACING ELECTRONIC FOR MEASUREMENT, SIGNAL PROCESSING AND WIRELESS COMMUNICATION

Edited by

Sheroz Khan, International Islamic University Malaysia

AHM Zahirul Alam, International Islamic University Malaysia

Anis Nurashikin Nordin, International Islamic University Malaysia

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Taman Perindustrian Batu Caves
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68100 Batu Caves
Selangor Darul Ehsan
Tel: +603-6188 1542 / 44 / 45 Fax: +603-6188 1543
EMAIL: iiumprinting@yahoo.com

CONTENTS

Chapter 31

PULSE OXIMETRY DESIGN USING ARDUINO BOARD

MUHAMMAD ARHAM, SYED ZULFAUZI AND OTHMAN O. KHALIFA

Health care is one of the most important aspects of our life. The objective is to design Pulse Oximetry for a clinical diagnostic using Arduino board that has analog and digital ports on it. Thus, by manipulating their characteristics, we have been able to create our prototype. The digital ports are used to connect to the red and infra-red LEDs to make them to be turned on in alternating sequence. The two LEDs are then connected to a common ground on the board. The detail proposed circuit diagram of the design and components used in the prototype building were explained. The phases of building the prototype are being discussed thoroughly.

31.1. INTRODUCTION

Oximetry is the determination of the amount of oxygen that is saturated in blood. Traditional pulse oximetery is done using a red LED and a infrared LED. The light is partly absorbed by hemoglobin, which differ depending on weather the hemoglobin is saturated or unsaturated with oxygen. The light then passes through the finger and into a photo detector. By calculating the absorptions at the different wavelengths, the amount of hemoglobin, which is oxygenated, can be computed. This method of pulse oximetry has been practiced using extremities of the body such as fingers, toes, and ear lobes. For neonatal purposes the pulse oximeter is used on the palm of the hand or the foot.

31.2. STATEMENT OF PROBLEM

In these modern days, heart attack diseases are increasing tremendously. Doctors cannot predict what kind of causes make this phenomenon happen. It's a random cases has been reported. People with a very healthy diet and good life style still can be exposed to this disease. Pulse oximetry could help people monitoring their health status accurately without limiting their mobility. People have to go to hospital or local clinic in order to know their condition at a time, and the purpose is to avoid that unneeded activities. Further the product should be light in weight and easy to be maintained.

31.3. DESIGN PROCEDURES

In order to build the prototype for our pulse oximeter, the building process is being divided into three phases. This is to ensure that our prototype are working to the intended